What is claimed is:

1. A kit for synthesizing a nucleic acid molecule, said kit comprising a peptide or polypeptide having ribonuclease activity.

2. A kit according to claim 1, wherein said peptide or polypeptide is selected from the group consisting of RNase A, RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof.

3. A kit according to claim 1, wherein said peptide or polypeptide is thermostable.

4. A kit according to claim 1, further comprising one or more components selected from the group consisting of:

a) one or more nucleotides;

b) one or more DNA polymerases;

c) one or more suitable buffers for nucleic acid synthesis; and

d) one or more primers.

5. A kit according to claim 4, wherein said DNA polymerase is thermostable.

6. A kit according to claim 5, wherein said thermostable DNA polymerase is selected from the group consisting of *Taq* DNA polymerase, *Tne* DNA polymerase, *Tma* DNA polymerase, *Tth* DNA polymerase, *Tli* or VENT™ DNA polymerase, *Pfu* DNA

polymerase, DEEPVENT™ DNA polymerase, *Pwo* DNA polymerase, *Bst* DNA polymerase, *Bca* DNA polymerase, and *Tfl* DNA polymerase or fragments, variants, derivatives or mutants thereof.

7. A kit according to claim 4, wherein one or more of said nucleotides are detectably labeled.

8. A method for synthesizing a nucleic acid molecule, said method comprising:

a) mixing a nucleic acid template, with one or more DNA polymerases, and one more peptides or polypeptides having ribonuclease activity; and

b) incubating said mixture under condition sufficient to synthesize a nucleic acid molecule complementary to all or a portion of said template.

9. The method according to claim 8, wherein said peptide or polypeptide having ribonuclease activity is selected from the group consisting of RNase A, RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof .

10. The method according to claim 8, said mixture further comprising one or more components selected from the group consisting of:

a) one or more nucleotides;

b) one or more DNA polymerases;

c) one or more suitable buffers for nucleic acid synthesis; and

d) one or more primers.

11. The method according to claim 8, wherein said DNA polymerase is thermostable.

12. The method according to claim 11, wherein said thermostable DNA polymerase is selected from the group consisting of *Taq* DNA polymerase, *Tne* DNA polymerase, *Tma* DNA polymerase, *Tth* DNA polymerase, *Tli* or VENT™ DNA polymerase, *Pfu* DNA polymerase, DEEPVENT™ DNA polymerase, *Pwo* DNA polymerase, *Bst* DNA polymerase, *Bca* DNA polymerase, and *Tfl* DNA polymerase or fragments, variants, derivatives or mutants thereof.

13. The method according to claim 10, wherein one or more of said nucleotides are detectably labeled.

14. A composition for synthesizing a nucleic acid molecule, said composition comprising one or more peptides or polypeptides having ribonuclease activity.

15. The composition according to claim 14, wherein said peptide or polypeptide is selected from the group consisting of RNase A,

RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof.

16. The composition according to claim 14, wherein said polypeptide or peptide is thermostable.

17. The composition according to claim 14, further comprising one or more components selected from the group consisting of:

a) one or more nucleotides;

b) one or more DNA polymerases;

c) one or more suitable buffers for nucleic acid synthesis;

d) one or more primers; and

e) one or more templates.

18. The composition according to claim 17, wherein said DNA polymerase is thermostable.

19. The composition according to claim 18, wherein said thermostable DNA polymerase is selected from the group consisting of *Taq* DNA polymerase, Tne DNA polymerase, *Tma* DNA polymerase, *Tth* DNA polymerase, *Tli* or VENT™ DNA polymerase, *Pfu* DNA polymerase, DEEPVENT™ DNA polymerase, *Pwo* DNA polymerase, *Bst* DNA polymerase, *Bca* DNA polymerase, and *Tfl* DNA polymerase or fragments, variants, derivatives or mutants thereof.

20. The composition according to claim 14, wherein said composition further comprises one or more DNA polymerases.

21. A method of sequencing a DNA molecule, comprising:

a) mixing a first DNA molecule with one or more polymerases, and one or more peptides or polypeptides having ribonuclease activity;

b) hybridizing a primer to said first DNA molecule;

c) contacting said DNA molecule of step (b) with deoxyribonucleoside triphosphates, and one or more terminator nucleotides;

d) incubating the mixture of step (c) under conditions sufficient to synthesize a random population of DNA molecules complementary to said first DNA molecule, wherein said synthesized DNA molecules are shorter in length than said first DNA molecule and wherein said synthesized DNA molecules comprise a terminator nucleotide at their 5' termini; and

e) separating said synthesized DNA molecules by size so that at least a part of the nucleotide sequence of said first DNA molecule can be determined.

22. The method according to claim 21, wherein said peptide or polypeptide is selected from the group consisting of RNase A, RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof.

23. The method according to claim 21, wherein said peptide or polypeptide is thermostable.

24. The method according to claim 21, wherein said deoxyribonucleoside triphosphates are selected from the group consisting of dATP, dCTP, dGTP, dTTP, dITP, 7-deaza-dGTP, dUTP, [α-S]dATP, [α-S]dTTP, [α-S]dGTP, and [α-S]dCTP.

25. The method according to claim 21, wherein said terminator nucleotides are selected from the group consisting of ddATP, ddCTP ddGTP, ddITP, ddTTP.

26. The method according to claim 21, wherein one or more of said deoxyribonucleoside triphosphates is detectably labeled.

27. The method according to claim 21, wherein one or more of said terminator nucleotides is detectably labeled.

28. A kit for sequencing a DNA molecule comprising one or more peptides or polypeptides having ribonuclease activity.

29. The kit according to claim 28, wherein said peptide or polypeptide is selected from the group consisting of RNase A, RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof.

30. The kit of claim 28, further comprising one or more components selected from the group consisting of

a) one or more dideoxyribonucleoside triphosphates

b) one or more deoxyribonucleoside triphosphates;

c) one or more DNA polymerases;

d) one or more suitable buffers for nucleic acid synthesis; and

e) one or more primers.

31. A method for amplifying a double stranded DNA molecule, comprising:

a) providing a first and second primer, wherein said first primer is complementary to a sequence at or near the 3' termini of the first strand of said DNA molecule and said second primer is complementary to a sequence at or near the 3'-termini of the second strand of said DNA molecule;

b) hybridizing said first primer to said first strand and said second primer to said second strand in the presence of one or more peptides or polypeptides having ribonuclease activity and one or more DNA polymerases under conditions such that a third DNA molecule complementary to said first strand and a fourth DNA molecule complementary to said second strand are synthesized;

c) denaturing said first and third strand, and said second and fourth strands; and

d) repeating steps (a) to (c) one or ore times.

32. The method of claim 31, wherein said peptide or polypeptide is selected from the group consisting of RNase A, RNase T1, RNase H, RNase S, RNase B, RNase C, and RNase T2 or fragments, variants, derivatives or mutants thereof.

33. The method according to claim 31, wherein said peptide or polypeptide is thermostable.

34. The method according to claim 31, wherein said DNA polymerase is thermostable.

35. The method according to claim 34, wherein said thermostable DNA polymerase is selected from the group consisting of *Taq* DNA polymerase, *Tne* DNA polymerase, *Tma* DNA polymerase, *Tth* DNA polymerase, *Tli* or VENT™ DNA polymerase, *Pfu* DNA polymerase, DEEPVENT™ DNA polymerase, *Pwo* DNA polymerase, *Bst* DNA polymerase, *Bca* DNA polymerase, and *Tfl* DNA polymerase or fragment, variants, derivatives or mutants thereof.

36. A kit for amplifying a nucleic acid molecule comprising one or more peptides or polypeptides having ribonuclease activity.

37. The kit according to claim 36 further comprising one or more components selected from the group consisting of:

a) one or more nucleotides;

b) one or more DNA polymerases;

c) one or more suitable buffers for nucleic acid synthesis; and

d) one or more primers.